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09/653,467	09/01/2000	Yao-Min Chen	3981-2	5476

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EXAMINER	
LEE, TIMOTHY L	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/653,467	Applicant(s) CHEN ET AL.	
	Examiner Timothy Lee	Art Unit 2662	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-13,15-22,24-27,32-37 and 39-42* is/are rejected.

7)☒ Claim(s) *5,14,23,28-31 and 38* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-4, 6-13, 15-22, 24-27, 32-37 and 39-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cloonan (US 2002/0009051) in view of Silberschatz et al. (US 6,556,578).

3. Regarding claims 11 and 42, Cloonan discloses a method and apparatus for controlling data flow. In order to accomplish the task of congestion control, the congestion control block 235 in Fig. 2 has control inputs that are used to determine when to drop packets and which packets to drop (when a drop/no drop decision is to be made for a data packet). These control inputs include the data rate signal, a buffer depth signal, and a priority signal. The data rate signal from the upstream data, quantizes the data rate and feeds that value to the congestion control block 235. The buffer circuit depth signal from the buffer circuit 205 instructs the congestion control block 235 as to the depth of the buffer. See paragraphs 0038 and 0039. The priority signal informs the congestion control of the priority of each packet. See paragraph 0040. The buffer circuit 205 is comprised of 128 MB of RAM. See paragraph 0050. Fig. 3 illustrates a matrix of settings of congestion control of the buffer circuit. See paragraph 0052. The matrix illustrates the priority and the data flow rate. See paragraph 0053. The blocks that make up the

intersection of each column and row is comprised of three values that are further illustrated in the plot of Fig. 4. The upper number in each block represents the minimum threshold value of the average buffer depth. This value is referred to as MIN. The middle value in each block is the maximum threshold of the average buffer depth. This value is referred to as MAX. See paragraph 0058. The third value in each block is the probability of a packet being dropped. In the illustrated example, the probability of a packet being dropped is 0.1 and is referred to as P. See paragraph 0060. In looking at the matrix, each column can be considered a "profile" for deciding the probability of when to drop a packet for a particular data rate (maintaining a pool of probability profiles). Cloonan does not expressly disclose having a different queue for each of the data flows—currently, all of the data goes to one buffer. Silberschatz et al. discloses having a buffer with a capacity of B divided among separate queues 23.1-23.4 which are associated with each of a respective data flow. See col. 3, lines 37-44. It would have been obvious to a person of ordinary skill in the art at the time of the invention to split the buffer of Cloonan into separate queues in the way that Silberschatz et al. teaches. After splitting into separate queues, each data flow would then have its own drop profile as shown in the matrix (associating each of the data packet queues with at least one drop probability profile selected from the pool...packet destined for a particular queue, using the profile associated with that queue to arrive at the drop/no drop decision). One would have been motivated to do this because the system could then make local decisions based on the buffer depth of a particular queue as opposed to the whole buffer, and space could be more efficiently allocated to the different data flows.

4. Regarding claim 33 more specifically, the "pipeline" in Cloonan is made up of blocks 260, 225, 230, and 235 in Fig. 2., where the buffer 205 would be the multiple queue packet

memory in the combination of Silberschatz et al. and Cloonan described above. The congestion control block 235 essentially snoops the packet to determine its relevant information, including its priority and data rate characterization (to snoop queue information from the packet while the packet is in the pipeline). The appropriate selection from the matrix would be segmented according to the properties of the particular packet and the buffer depth conditions (select a segment-based probability profile corresponding to the queue information and produce a decision).

5. Regarding claims 1, 13, 21, and 40 more specifically, Cloonan. discloses obtaining the buffer depth through the buffer depth signal (receiving an average queue size for the queue). See paragraph 0039. Cloonan also discloses segmenting the probabilities according to queue depth. In Fig. 4, if the depth is less than MIN, then no packets are dropped. If the depth is above MAX, then all packets are dropped. If the depth falls in between then it takes on some probability from 0 to Pa. These segments are associated with every profile for each of the data flows (determining whether the average queue size falls within one of N segments...basing a drop/no-drop decision, for a data packet associated with the queue, on the drop probability associated with a segment). See paragraphs 0064-0066.

6. Regarding claims 2, 20, and 41, as shown in the matrix of Cloonan, there are 5 different drop probability possibilities depending on the priority of the packet (M drop probability profiles are associated with the queue).

7. Regarding claims 3, 4, 12, 19, 22, 24, and 26, as mentioned previously, each of the column/row combinations shown in the matrix of Fig. 3 of Cloonan has a MIN and a MAX threshold. The difference between the two can be considered a "delta" threshold. It is inherent

that the system should be able to identify what segment it is dealing with after inputting the three factors in deciding what packet to drop.

8. Regarding claims 6, 15, and 25, the MIN and MAX values are stored in memory (segment endpoints are stored with the profile).

9. Regarding claims 7 and 16, as mentioned previously, within the segment located between the MIN and the MAX, the probability is established according to the graph shown in Fig. 4 (performing a random trial outcome having 2 outcomes, drop and admit, where the probability of the drop is P).

10. Regarding claims 8, 17, and 18, in the particular example shown in Fig. 3, all of the drop probabilities are set at 0.1, so they are the same for all of the profiles. Also, it is inherent that these values are stored in memory.

11. Regarding claim 9, Cloonan discloses that the probability can change based on the buffer depth, so multiple drop probabilities can exist if there are different depths in the various queues of the combination of Cloonan and Silberschatz et al.. See paragraph 0065 of Cloonan.

12. Regarding claim 10, each column represents a different profile for each data flow or queue, and each defines its segments accordingly because they have different MIN and MAX values.

13. Regarding claim 27, Cloonan does not expressly disclose a profile pointer register. However, it would have been obvious to a person of ordinary skill in the art at the time of the invention to have a pointer register included in the system of Cloonan. One would have been motivated to do this because accessing pointers can be much faster than accessing the actual profile, so this would speed up the capabilities of the system.

14. Regarding claim 32, Cloonan does not expressly disclose generating a random number for the probability comparator, but Silberschatz et al. discloses generating a random number in order to decide if a packet gets dropped or admitted. See col. 4, lines 35-39. It would have been obvious to combine the random number generation step from Silberschatz et al. into the system disclosed by Cloonan. One would have been motivated to do this because this is an efficient method to decide if a packet is dropped or not dropped based on a probability value.

15. Regarding claim 34, in the combination of Cloonan and Silberschatz et al., the system would be able to keep running averages of the queue depths for each of queues for the different data flows. Silberschatz et al. mentions doing this for the separate queues. See col. 5, lines 1-9.

16. Regarding claim 35, as mentioned previously, the each queue would be associated with a certain type of data flow, anywhere from needy to super greedy. The queue information also contains priorities of all of the packets. See Fig. 3 of Cloonan.

17. Regarding claim 36, as mentioned previously, the drop probability depends on both data flow rate (i.e. the destination queue) and the priority of each of the packets.

18. Regarding claim 37, the drop probability is assigned when the packet is still in the congestion control section, so the drop priority occurs while the packet is still in the pipeline.

19. Regarding claim 39, it is inherent that the packets are coming form different users and hence different ingress interfaces, or there would be no need to sort and prioritize the data coming to the congestion control block.

Allowable Subject Matter

20. Claims 5, 14, 23, 28-31, and 38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ott et al. (US 6,560,198), Rusu et al. (US 6,141,323), and Muller et al. (US 6,606,301) disclose system that relate to random early detection and congestion control.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy Lee whose telephone number is (703)305-7349. The examiner can normally be reached on M-F, 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on (703)305-4744. The fax phone number for the organization where this application or proceeding is assigned is (703)872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-4700.

TLL
Timothy Lee
January 12, 2004

HASSAN KIZOU
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